



**PennState**  
College of Information  
Sciences and Technology

# Office of Graduate Programs

# 2023–2024

## M.S. Degree Roadmap



[ist.psu.edu/graduate-students](https://ist.psu.edu/graduate-students)

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# About the College of Information Sciences and Technology

Solving society's most challenging problems—from responding to natural disasters to improving human health and well-being; from protecting national security to making sense of big data in community and scientific settings; from exploring the connections between gender and technology to finding novel ways to use artificial intelligence in socially responsible ways—calls for approaches that transcend traditional disciplinary boundaries. Precise computational models are needed to learn from the vast datasets available. Scientific theory is needed to describe the complex relationships we encounter in the ecosystem we inhabit, one that includes complex and overlapping networks with an increasing number of virtual friends, collaborators, and customers.

At Penn State's College of Information Sciences and Technology (IST), you will receive a multidisciplinary education that prepares you to address complex issues related to technology and society. Our graduate students come from a variety of backgrounds, including computer science, engineering, psychology, sociology, economics, philosophy, visual arts, and math. The students work with graduate faculty distributed across four focus areas: Human-Centered Design and Development; IST and Security Risk Analysis; Cybersecurity; and Data Sciences.

The College of IST's faculty and graduate students engage in cutting-edge research in areas such as human-centered design of software, devices and platforms; artificial intelligence and cognitive science; computer security and information privacy; health- and bio-informatics; and the sociology of disaster response, to name just a few. We excel in cybersecurity research, exploring how we can better protect companies from cyber-attacks and nations from cyber war. We examine information retrieval, search engines, and big data as a means to understand complex knowledge and societal and economic relationships. We study cognition and human-computer interfaces in order to comprehend how an individual's abilities and limitations fit into a connected world full of technology. To succeed in all of these areas, as a graduate student in IST you will develop important skills in the computer and data sciences, as well as in the social and behavioral sciences. You will learn how to analyze qualitative and quantitative effects in data, and be able to understand, test, and contribute to scientific theory.

## Rankings

Penn State is ranked by Times Higher Education (2023) in the top 6% of higher education institutions worldwide. Penn State's graduate schools also consistently rank highly in disciplines relevant to IST by U.S. News & World Report. Among iSchools, a consortium of information schools dedicated to advancing the information field in the 21st century, IST at Penn State is unique in its focus on human-centered design, enterprise informatics, cybersecurity, and data and computational sciences.

## Faculty Adviser and Annual Review

In IST, each Integrated Undergraduate Graduate (I.U.G.) or M.S. student is encouraged to identify a member of the IST Graduate Faculty who is willing to serve as his or her faculty adviser, especially if interested in completing the thesis culminating experience option. However, M.S. students may complete the entire program in one year without partnering with a faculty advisor. These students rely on IST's Graduate Programs office communications on course offerings and instead complete the scholarly paper or project capstone culminating experience project in a classroom course setting.

For students completing the master's thesis and degree over two years, described below is the role of the faculty adviser, the process for students to identify faculty advisers upon entering the master's program, and an explanation of the annual review.

### A. Role of Faculty Adviser

The faculty adviser provides advice and mentoring to the master's student (advisee) on issues related to research and academics for completion of the master's thesis option. This culminating experience option typically requires two full years to complete, and a thesis committee of three faculty members. During the first year of a student's graduate study, the adviser helps the student to identify potential research topics and to begin the reading and synthesis of related literature. As appropriate, the adviser also guides the student toward specific research projects and outcomes, either individually or as part of a larger ongoing research team. The adviser also provides feedback to the student about research ideas, research progress, and research outcomes. At the end of the first year, this is synthesized as an annual evaluation. The adviser helps the student regarding his or her academic studies. In general, the faculty adviser helps the student become familiar with the program and its requirements. Finally, the adviser assists and advises the student on career planning.

### B. Identifying Faculty Advisers by Newly Admitted Students

New students considering the master's thesis option are encouraged to interact with IST Graduate Faculty members of interest using e-mail, phone or online meeting conversations prior to or upon arrival at Penn State (or, in the case of I.U.G. students, during the semester in which the student applies). It is important to thoroughly "research" the faculty member, including familiarization with the research interests and publications, before contacting them to request a meeting.

As all new graduate students are required to arrive on campus before mid-August to participate in various orientation events, this time may also use this time to conduct face-to-face meetings with potential advisers. As needed, the student may also meet with the Director of Graduate Programs to explore potential adviser matches.

The expectation is that new master's graduate students seeking to complete a research thesis will begin working with their advisers by the last day of completing the first semester, and no later than the middle of the second semester. Student advisers are officially

recorded by filling out a Student-Adviser Agreement form submitted to IST's Graduate Programs Office.

## **C. Annual Review**

An annual review will be conducted each September/October to evaluate the progress of M.S. and I.U.G. students completing a master's thesis in their graduate studies. As part of the review process, each graduate student completes an online Annual Evaluation form and updates his/her curriculum vitae (CV). Then, each student meets with his/her adviser to discuss coursework completed or to be taken, research progress, related issues, and plans for the following year. After this meeting, the adviser rates the student's performance and provides written comments to explain the rating. Each year, the Director of Master's Programs reviews the evaluation materials prepared by the students and their advisors, to ensure that all students are making the progress expected.

In the event that the faculty adviser or the GAC determines a student's progress needs improvement or fails to meet performance expectations, steps are taken to understand the nature of the problem and to develop a plan for addressing these issues. Each student receives a formal notification of their annual evaluation results with associated actions to take as needed. On some occasions, an adviser change will be recommended, while in other cases, the student may be required to complete specific tasks on a stated timeline.

In cases of extreme and continued academic difficulties, a student may be terminated from the program. If a student may be terminated for academic reasons (unsatisfactory scholarship, he or she will first receive a written notice of the problem(s), in accordance with Graduate School policy [GCAC-803](#), enabling a possible appeal and/or a self-correction process to address the stated problem(s).

## **General Assistantship Policies**

### **A. M.S. and I.U.G. Students**

Master's and I.U.G. students accepted into the College of IST are rarely offered a college-based teaching assistantship (TA). In some cases when teaching support needs are extensive, a few M.S. or I.U.G. students may be offered a TA. Some M.S. and I.U.G. students may also qualify for research assistantships (RA) to work on a specific project. In other cases where there are teaching support needs, an M.S. or I.U.G. student may be hired to fill a wage payroll instructional assistant position, but these wage-payroll positions do not include a tuition waiver or health benefits. Appointments automatically end at the conclusion of each semester and appointments carry no guarantee of renewal.

#### ***Instructional Assistant (IA)***

An IA is assigned to support one or more specific courses for a particular semester, not to support a faculty member. Funds are provided by the College. In other words, if a faculty

member other than the student's adviser teaches a course to which an IA is assigned, the student is supervised in his/her teaching-related responsibilities by this other faculty member. We refer to the faculty member who teaches the course section(s) to which an IA is assigned as the IA's *supervisor*. Students who receive IA support generally possess specialized skills or experience gained through prior academic or work experience.

IAs should meet with their supervisors no later than the week prior to the start of the semester to coordinate plans for teaching support; they will also meet regularly during the semester as specified by the supervisor. Once assignments have been announced, IAs should contact their supervisors to let them know when they are available for meetings prior to the start of the semester. Initially, the IAs should expect to receive a course syllabus and possibly a textbook if one is used; any information to be distributed to the students; and specific details about what they are expected to do over the course of the semester. IAs and their supervisors should discuss the instructional goals and objectives of the course and the means to accomplish them. Periodically, meetings should be held to emphasize specific assignments or projects and how these should be evaluated. IAs may be asked to attend course lectures and labs, and should be fully aware of their instructors' emphases and expectations of the students.

IA positions provide compensation by hourly wages. IAs may be asked to complete a wide variety of tasks including the following: grading homework, projects, and examinations; preparing assignments; preparing solutions for posting or distribution; maintaining office hours and holding special lab or review sessions; helping to prepare, photocopy, and administer examinations; preparing and setting up demonstrations; processing grade data, and perhaps, assigning grades. IAs should track the number of hours they spend completing these tasks each week; the hours worked will be submitted every two weeks for payment.

Before the first week of the semester, the IA and supervisor are required to meet and complete a Responsibility Agreement form to assure that all start-up details have been discussed and arranged. At mid-semester and again at the end of the semester, the supervisor and students enrolled in the course should complete evaluation forms electronically for each IA in the course.

If an IA must be absent from an assigned job due to illness, a personal emergency, or professional trips, the IA must notify the supervisor at the first knowledge of such an absence and work with the supervisor to ensure that responsibilities are covered.

**IMPORTANT:** *IAs should not make travel plans the week before the semester begins, the last week of the semester, or the week immediately following the end of classes.* These periods are critical for preparation before the semester begins, and for end-of-semester grading and grade calculations. In exceptional situations, a supervisor may agree to allow an IA to depart early or arrive late, but this should never be assumed by the IA. Permission for such exceptions must be requested in advance from the supervisor and documented through the Graduate Programs Office. Assistants who fail to follow these requirements will not receive funding for the following semester.

**NOTE:** Enrollment in IST 602 (Supervised Experience in College Teaching) is required for all students during the first semester they are serving as an IA. This course is offered every fall and spring semester and is designed to help new instructional assistants become more effective in their teaching. It also provides instructional assistants with the opportunity to discuss particular issues that arise in the classroom.

## **Research Assistantships (RA)**

An RA's supervisor is most often the student's faculty adviser; the supervisor will, to some degree, dictate the supporting coursework and other aspects of the research assistant's preparation needed to fulfill the assistantship responsibilities. When the research supervisor is also the faculty advisor, supervision of research assistant duties and progress towards completion of the doctoral dissertation may be difficult to separate, but these concerns can be addressed through conversation with the advisor. The combination of the research appointment and the registration for coursework or dissertation credits should represent a realistic workload. The university does not require RAs to track the hours worked each week, but a research supervisor may ask for this information.

RAs may be expected to do any of the following: design and implement software; design and conduct experiments involving human subjects, including applications for Institutional Review Board (IRB) approval; collect and process data; search for materials at the University Libraries or perform Web research; interact with sponsors and vendors; prepare reports and related presentation materials; attend meetings and seminars; participate in writing manuscripts for conference and journal submissions; participate in preparing presentations for conferences; and assist in preparing research funding proposals as directed.

The RA's supervisor will clarify the specific work needed for a given research assistantship position, regularly oversee the work, and evaluate the work, dependability, and readiness of the RA to move to higher levels of responsibility such as taking the lead on data analysis, helping to supervise undergraduate research assistants, crafting of manuscripts, and making presentations.

***IMPORTANT:*** *RA's should not make travel plans the week before the semester begins, the last week of the semester, or the week immediately following the end of classes. RA's must be present during the time frame stated on the signed terms of offer form.* In exceptional situations a supervisor may agree to allow a RA to depart early or arrive late, but this should never be assumed by the RA. Permission for such exceptions must be requested in advance from the supervisor and documented through the Graduate Programs Office. Assistants who fail to follow these requirements will not receive RA funding for the following semester.

## **Teaching Assistantships (TA)**

A TA is assigned to support one or more specific courses for a particular semester, not to support a faculty member. Funds are provided by the College. In other words, if a faculty member other than the student's adviser teaches a course to which a TA is assigned, the student is supervised in his/her teaching-related responsibilities by this other faculty member. We refer to the faculty member who teaches the course section(s) to which a TA is assigned as the TA's *supervisor*. Students who receive TA support generally possess specialized skills or experience gained through prior work experience.

TAs should meet with their supervisors no later than the week prior to the start of the semester to coordinate plans for teaching support; they will also meet regularly during the



semester as specified by the supervisor. Once assignments have been announced, TAs should contact their supervisors to let them know when they are available for meetings prior to the start of the semester. Initially, the TAs should expect to receive a course syllabus, a textbook if one is used, any information to be distributed to the students, and specific details about what they are expected to do over the course of the semester. TAs and their supervisors should discuss the instructional goals and objectives of the course and the means to accomplish them. Periodically, meetings should be held to emphasize how specific assignments or projects should be evaluated. TAs should expect to attend course lectures and labs, and should be fully aware of their instructor's emphasis and expectations of the students.

TAs may be asked to complete a wide variety of assignments including the following: grading homework, projects, and examinations; preparing assignments; preparing solutions for posting or distribution; maintaining office hours and holding special lab or review sessions; helping to prepare, photocopy, and administer examinations; prepare and set up demonstrations; processing grade data, and perhaps, assigning grades.

Before the first week of the semester, the TA and supervisor are required to meet and complete a Responsibility Agreement form to assure that all start-up details have been discussed and arranged. At mid-semester and again at the end of the semester, the supervisor and students enrolled in the course should complete evaluation forms electronically for each TA in the course.

If a TA must be absent from an assigned job due to illness, a personal emergency, or professional trips, they must notify the supervisor at the first knowledge of such an absence and work with the supervisor to ensure that his/her responsibilities are covered.

***IMPORTANT:*** *TA's should not make travel plans the week before the semester begins, the last week of the semester, or the week immediately following the end of classes.* These periods are critical for preparation before the semester begins, and for end-of-semester grading and grade calculations. In exceptional situations, a supervisor may agree to allow a TA to depart early or arrive late, but this should never be assumed by the TA. Permission for such exceptions must be requested in advance from the supervisor and documented through the Graduate Programs Office. Assistants who fail to follow these requirements will not receive TA funding for the following semester.

***NOTE:*** Enrollment in IST 602 (Supervised Experience in College Teaching) is required for all students during the first semester that they serve as a TA. This course is offered every fall and spring semester and is designed to help new teaching assistants become more effective in their teaching-related responsibilities. It also provides teaching assistants with the opportunity to discuss particular issues that arise in the classroom.

## **Student Insurance**

All graduate assistants (RAs and TAs) and any dependents who accompany them must have health insurance. A student may choose to purchase insurance separately and provide evidence that their policy meets the standards of Penn State. Otherwise, a student will be enrolled in a group policy for students. More information can be obtained by contacting the [Graduate Student Association](#) or the [Graduate Student Insurance Office](#).

## Stipends- (TAs or RAs Only)

Stipends are delivered electronically into the student's local bank account five times each semester on the last working day of the month and twice during the summer (if hired for summer). **Please note - a newly appointed graduate assistant arriving in August may not receive his or her first paycheck until the end of September.**

## AEOCPT

All international students must take the American English Oral Communication Proficiency Test (AEOCPT) upon arrival. No international student will be assigned to a teaching assistantship until this test is passed or remediation steps (typically taking English language courses) have been completed. More information can be obtained by contacting the [Department of Applied Linguistics](#).

## Scholarship and Research Integrity (SARI) Training

All graduate students are required to complete Scholarship and Research Integrity (SARI) training specified by their college/department. Penn State's Scholarship and Research Integrity (SARI@PSU) program is designed to offer Penn State researchers and scholars comprehensive, multilevel training in the responsible conduct of research (RCR), in a way that is tailored to address the issues typically faced by individual disciplines. SARI@PSU programs address topics such as publication practices and responsible authorship, conflicts of interest, research misconduct, peer review, mentoring, data management, collaborative research, human subjects' protections, and animal welfare. In general, SARI@PSU addresses these issues through two initiatives: an online RCR training program offered by CITI (Collaborative Institutional Training Initiative at the University of Miami), and interactive, discussion-based RCR education. All graduate students at Penn State, who matriculate in fall of 2009 or later, are required to complete the SARI@PSU requirements prior to graduation.

The College of IST requires the following trainings within the first semester:

Doctoral Students -

- Human Subjects Research (IRB) **and**
- Responsible Conduct of Research (RCR), along with five hours of discussion-based training that is covered in IST 590 (graduate colloquium).

Masters Students –

- Human Subjects Research (IRB) **and**
- Responsible Conduct of Research (RCR), along with case study within the online modules.

The detailed SARI Training information will be sent to students prior to the start of the first semester.

This training plan and student participation report is available from the [Office for Research Protections](#) upon request.

# Important International Student Registration Information

## ***Enrollment Requirements***

Both F-1 and J-1 students must maintain full-time academic status. Graduate students may enroll for variable credits up to fifteen (15), with nine (9) credits being the minimum required to fulfill DHS visa requirements for full-time enrollment.

[Exceptions to full-time study](#) must be cleared through the International Student Adviser in advance by completing the [Reduced Course Load eForm](#) in iStart. All exceptions granted by the International Student Adviser must be reported to DHS within 21 days as well as the return to full-time status. Note: Exceptions to full-time study due to academic difficulties are limited to one semester during the entire program of study; documented medical illnesses are limited to one year during the program of study. Failure to enroll for full-time study or to obtain approval from the International Student Adviser in advance is automatically out-of-status.

## ***Distance Education or Web-Based Courses***

F-1 students may count only one 3-credit course in distance education (Independent Learning, World Campus, web) or on-line course towards full-time enrollment each semester

J-1 students must enroll full-time in resident instruction classes.

F-1 and J-1 students cannot change their campus designation to World Campus. Full-time enrollment in World Campus is a violation of F-1 and J-1 status. In addition, if you have been approved for a reduced course load or your last enrollment is in summer session, you cannot be enrolled for only distance education (web-based) courses. Both full-time or part-time students must have resident instruction classes or you do not need to be in F-1 or J-1 status. You can take web-based course from outside the United States.

## ***Summer Enrollment***

If a student does not intend to enroll in fall, then summer is not a vacation period.

Students who intend to graduate or complete their program in summer, ***must enroll*** in the summer. Enrollment must be for a resident credit (not web-based); although 3 credits of online course (Penn State World Campus) is allowed, a resident class must also be taken. Full-time enrollment must be maintained at Penn State.

Students who are not completing their program of study in summer and who plan to return in the subsequent fall semester are not required to enroll in summer because it is considered a vacation period.

## **Master's (M.S. and I.U.G.)**

**M.S. in Cybersecurity Analytics and Operations**

**M.S. in Informatics**

**I.U.G. - available for the M.S. in Informatics**

## **The Master's Programs**

In the master's programs, you are expected to engage more deeply in an intellectual conversation with research and science than what you would normally do as part of an undergraduate degree. The degree typically opens up advanced career opportunities, both in industry or as preparation for a Ph.D. As an M.S. or I.U.G. student; you will take many of the same courses as the Ph.D. students, and have the option to produce a thesis worthy of publication or a scholarly paper that could be submitted to a conference. The M.S. programs are available to be completed in one year or two years.

On the following pages, you will find useful information about how our master's programs are structured, and a description of the expectations we have for our graduate students. In addition, this Handbook provides details of the university and college policies and procedures that will govern your time here at Penn State.

### **A. Full-time Matriculation**

Graduate students in the IST M.S. program are expected to matriculate on a full-time basis at the University Park campus each fall and spring semester. There are no exceptions to the requirement for full-time, on-site matriculation. In addition, new students in the M.S. program are ordinarily expected to begin their studies in the fall semester of their first year.

### **B. Time Limitation**

All requirements for a master's degree (including acceptance of a thesis or scholarly paper as may be specified), whether satisfied on the University Park campus or elsewhere, must be met within two years of admission to degree status.

### **C. Language and Communication**

All candidates must be competent in the English language and must have demonstrated skills in the communication of ideas both orally and in writing commensurate with the requirement of professional work.

# **M.S. in Cybersecurity Analytics and Operations**

Master's students in Cybersecurity Analytics and Operations (M.S.) must complete a minimum of 30 credits at the 400, 500, 600 or 800 level with at least 18 credits in the 500 or 600 series combined; 27 of the 30 credits must be earned at Penn State.

## ***Core Requirements (15 credits)***

The objectives of this M.S. degree are to create a deep understanding of cybersecurity analytics and operations, by blending education relating to technology, incident response, strategic planning, and crisis management. The core courses of this program are:

- IST 543 (Foundations of Software Security)
  - IST 554 (Network Management and Security)
  - IST 815 (Foundations of Information Security and Assurance)
  - IST 820 (Cybersecurity Analytics)
  - IST 825 (Technologies for Web and E-Commerce Application Security)
- ❖ IST 504 (Foundations of Theories and Methods of IST Research) – students will be required to take this course in their first semester which will be applied as an elective. Students will learn how to first research and then approach faculty to act as their advisor. Students will also explore the differences between the three culminating experiences.

## ***Elective Requirements (9-12 credits)***

In consultation with his/her adviser, a candidate is expected to choose courses in one or more areas customized to support the thesis or scholarly paper requirement.

- IST 511 (Information Management: Information and Technology)
- IST 512 (Information Processing Architecture and Technology)
- IST 555 (Intelligent Agents and Distributed Decision Making)
- IST 557 (Data Mining)
- IST 558 (Data Mining II)
- IST 564 (Crisis, Disaster, and Risk Management)
- IST 805 (Cybersecurity Forensics and Management)
- IST 841 (Search Engines and Information Retrieval)
- IST 868 (Topics in Visual Analytics for Security Intelligence)

## ***Culminating Experience (3-6 credits)***

### **Thesis, Scholarly Paper OR Capstone Course (3-6 credits)**

Students may choose a thesis, scholarly paper or capstone course to fulfill the culminating experience.

#### **Thesis**

Students who choose the thesis option must register for 6 credits of IST 600 or IST 610, write a satisfactory thesis accepted by the master's committee, the head of the graduate program, and the Graduate School, and pass a thesis defense. Selecting the thesis option may require more than 1-year to complete. We recommend you take IST 505 if you choose the thesis option, it can be applied as an elective.

### **Scholarly Paper**

Students who choose the scholarly paper option must register for at least 3 credits of IST 594 and complete the scholarly paper. The scholarly paper will be a focused piece of technical work that applies the student's expertise and knowledge base, and that is documented and presented as a scholarly paper report.

### **Capstone Course**

Students who choose the capstone course option must register for IST 584 to complete the capstone course requirement. This course uses a Cyber event simulation (often referred as Cyber Range), which by its nature, allows for a variety of real-world Cybersecurity scenarios/problems to be simulated for students. Students are expected to utilize the knowledge and skills gained in previous coursework to solve each Cybersecurity scenario/problem in a given week of the class.

This course is only offered during summer (1yr plan) and spring (2yr plan).

Note: Students who choose the thesis or scholarly paper have the option to work on their research project in more than one semester. You can take up to 6 credits towards the research project across multiple semesters, this means as little as 1 credit in a semester up to a total of 6 credits. Please ask if you need help planning.

## **M.S. in Informatics and I.U.G.**

Master's students in Informatics (M.S. and I.U.G.) must complete a minimum of 30 credits with 20 of these credits earned at the University Park campus. These include 3-6 credits of core requirements and 24-27 credits of primary and supporting field requirements. Reflecting the interdisciplinary nature of the program, many of the approved elective courses are offered by other colleges.

### ***Core Requirements (3-6 credits)***

All Informatics M.S. and I.U.G. students are expected to develop a broad understanding of the core constructs of people, information, technology, and the significant interactions among those elements by taking IST 504 (required) in the fall and IST 505 (optional) in the spring of their first year. Students pursuing a research-focused program are strongly encouraged to register for IST 505 in the spring of their first year.

### ***Research Methods Requirements (6 credits)***

All Informatics candidates must develop a basic understanding of the research methods utilized in the information sciences, by taking two graduate level research methods courses offered in IST or elsewhere. The focus of the course must be on the methods being learned rather than application of some method to a research domain. A list of approved courses is kept on file with the graduate programs office.

### ***Specialty Area Requirements and Electives (12-18 credits)***

In consultation with his/her adviser, a candidate is expected to choose courses in one or more areas customized to support the thesis or scholarly paper requirement. In addition to advanced courses in IST, a specialty area could be in law, business, education, engineering, the liberal

arts, science, or any area that is linked to the information sciences. These courses can be at the 400 or 500 level with a maximum of 6 credits at the 400 level. Students who register for IST 596 as part of their coursework must fill out a Request for Independent Study form.

### ***Thesis or Scholarly Paper (3-6 credits)***

Students may choose a thesis or scholarly paper to fulfill the culminating experience.

#### **Thesis**

Students who choose the thesis option must register for 6 credits of IST 600 or IST 610, write a satisfactory thesis accepted by the master's committee, the head of the graduate program, and the Graduate School, and pass a thesis defense. Selecting the thesis option may require more than 1-year to complete. We recommend you take IST 505 if you choose the thesis option, it can be applied as a research methods course.

#### **Scholarly Paper**

Students who choose the scholarly paper option must register for at least 3 credits of IST 594 and complete the scholarly paper. The scholarly paper will be a focused piece of technical work that applies the student's expertise and knowledge base, and that is documented and presented as a scholarly paper report.

**Note:** Students who choose the thesis or scholarly paper have the option to work on their research project in more than one semester. You can take up to 6 credits towards the research project across multiple semesters, this means as little as 1 credit in a semester up to a total of 6 credits. Please ask if you need help planning.

## **Master's Committee Selection (Thesis Only)**

An M.S. and I.U.G. degree-seeking student who selects the thesis option must formally select his or her Master's Degree Committee no later than the completion of their general degree requirements. This normally occurs after completing the first year of studies.

This committee will be composed of three members with at least two Penn State graduate faculty members. At least two of the committee members should be graduate faculty members of IST.

By the end of the first semester of study, the student should formulate a plan of research and begin to identify members of the Master's Degree Committee.

## **Master's Thesis Defense**

### **A. Objective**

The objective of the Master's Thesis Defense is to assess a M.S. or I.U.G candidate's research accomplishments based on the completion of a final draft of the candidate's thesis. This is to be facilitated by the M.S. or I.U.G. candidate submitting the final draft of the thesis

to the Master's Committee and by presenting the thesis at a formal meeting of his or her committee that is open to the University community. Once the final thesis is approved, it will be submitted and archived electronically via eTD's to be accessible worldwide.

## B. Graduate School Guidelines

Changes to the official [Graduate School Bulletin](#) take precedence over the content of this section.

The M.S. or I.U.G. candidate who has satisfied all other requirements for the degree will schedule the final examination on the recommendation of the Master's Committee chair. Please note that there will be specific deadlines determined by the Graduate School for each semester. In particular, note that the deadline for submitting the thesis draft is very early in the semester (see [Thesis, Dissertation, Performance and Oral Presentation Calendar](#)). The date to upload the **final draft** of the thesis is about one month before the end of the semester. Two weeks' notice is required by the Office of Graduate Enrollment Services for scheduling this examination. The student must submit his/her IST Exam Request Form and IST Degree Audit by going to the [IST Graduate Student website](#) one month prior to the examination, this allows time to process the request and meet the Graduate School's two week notice requirement. If the exam request is not received at least two weeks in advance the request will not be processed and a new exam date will need to be selected. The deadline for holding the examination is six weeks before commencement. It is the responsibility of the M.S. or I.U.G. candidate to provide a copy of the thesis to each member of the Master's Committee *at least two weeks* before the date of the scheduled examination.

Both the thesis adviser and the student are responsible for ensuring the completion of a draft of the thesis and for adequate consultation with members of the Master's Committee well in advance of the final oral examination. Major revisions to the thesis should be completed before this examination. The thesis should be in its final draft, with appropriate notes, bibliography, tables, etc., at the time of the final oral examination. Both the content and style should be correct and polished by the time this final draft of the thesis is in the hands of the Master's Committee.

The Master's Thesis Defense is an oral examination administered and evaluated by the entire Master's Committee. It consists of an oral presentation of the thesis by the candidate and a period of questions and responses. These will relate in large part to the thesis, but may cover the candidate's entire program of study, because a major purpose of the examination is also to assess the general scholarly attainments of the candidate.

The Comprehensive examination (dissertation defense) may be held fully in-person, fully remote, or hybrid with some individuals participating in-person while others participate remotely.

Student preference for delivery mode should be strongly considered, but the student and adviser must agree on the mode. If the student and adviser cannot agree on the mode, the Director of Doctoral Programs will make the final decision. Either the student or adviser can appeal the decision of the Director of Doctoral Programs to the Associate Dean of Faculty and Graduate Affairs.

A favorable vote of at least two-thirds of the members of the committee is required for



passing the final master's oral examination. The results of the examination are reported to the IST Graduate Programs Office via the Completion of Master's Final Defense form to become part of the student's graduate file. Students receive approval from the committee by receiving their signatures electronically via eTD. If a candidate fails, it is the responsibility of the Master's Committee to determine whether or not another examination may be taken.

## General Thesis Requirements

The Graduate School, the University Libraries, and the graduate faculty of Penn State have established format standards that a thesis must meet before it receives final approval as a fulfillment of a graduate requirement. The [Thesis Office](#) is the unit of the Graduate School responsible for certifying that dissertations/theses have been prepared in accordance with these established regulations.

Every dissertation/thesis must be reviewed and approved by the Thesis Office staff. That office reviews for format only and does not edit for spelling, grammar, or punctuation. When a dissertation/thesis is submitted to the Thesis Office, it must meet the formatting and deadline requirements set forth in the latest edition of the [Thesis Guide](#). Information Technology Services (ITS) offers [PSTT](#) (Penn State Thesis Template). This is a software package that contains templates including styles, macros, toolbars, menus, and layouts. The [Statistical Consulting Center](#) gives advice to graduate students working on thesis research. The [Graduate Writing Center](#) in 111-H Kern Graduate Building provides consultation to graduate students in all disciplines.

A master's thesis must be submitted electronically. Please go to the following site for mandatory deadlines, the first of which comes **very early** in the semester. The link is: [Thesis, Dissertation, Performance and Oral Presentation Calendar](#). For more information on electronic dissertations/theses (eTDs), visit the [eTD's website](#).

In all cases, the dissertation/thesis author bears the ultimate responsibility for meeting Graduate School requirements. It is the dissertation/thesis author who must pay the dissertation/thesis fee, activate the intent to graduate, meet deadlines for submission and corrections, and obtain faculty signatures.

A summary of the dissertation/thesis submission requirements is provided below. The dissertation/thesis author should:

- Become familiar with the format requirements by reading the [Thesis Guide](#) carefully and be aware of all Graduate School and Thesis Office deadlines as indicated on the [Thesis, Dissertation, Performance and Oral Presentation Calendar](#).
- Activate the intent to graduate on [LionPATH](#) during the semester in which you plan to graduate. Go to the [Thesis, Dissertation, Performance and Oral Presentation Calendar](#) for deadlines.
- Upload a draft of your thesis for format review (word or pdf file) to the [eTD website](#) by the specified deadline. Corrections and detailed instructions will be returned to you by e-mail within two weeks.
- Make any changes required by the adviser and committee members. Receive approval in

the form of signatures on the [Master's Signatory Page](#).

- Review the thesis one final time to be sure that no further changes are needed. It will not be possible to make corrections after final approval by the Thesis Office.
- Go to the [eTD website](#) and upload the final eTD; submit supporting materials to the Thesis Office (Note: It doesn't matter if you upload first or submit the materials first).

Supporting materials are: signed Master's Signatory Page and \$25 thesis fee collected via PSUPAY.

- Await notification of thesis approval by e-mail. If changes are required, you will be notified. Your eTD will be accessible on the eTD website immediately after graduation unless you have restricted access (See top of Master's Signatory Page).
- If bound copies are needed, contact [Multimedia & Printer Center](#) on campus or you may use an off-campus source. All copies are the author's responsibility. The Graduate School does not provide copies.

## Master's Scholarly Paper

### A. Objective

The Master's Scholarly Paper should be a focused piece of technical work that applies the student's expertise and knowledge base. This option is for those whose primary goal is to gain advanced knowledge and skills in the information sciences and technology field. The scholarly paper is not submitted to the Graduate School's Thesis Office and is not archived.

### B. IST Guidelines

The M.S. or I.U.G candidate who has satisfied all other requirements for the degree will submit the scholarly paper to their adviser. If desired by the candidate's adviser or candidate, an oral presentation may be scheduled. If a presentation is to be scheduled, one month's notice is required for scheduling the oral presentation. Please go to the [IST Graduate Student website](#) to complete and upload a degree audit and submit a request for the completion of your Master's Scholarly Paper.

## Integrated Undergraduate Graduate (I.U.G.)

(Available for the M.S. in Informatics only)

The Integrated Undergraduate Graduate (I.U.G.) Degree Program offers the chance for highly qualified students to obtain the baccalaureate and master's degree in less time than it would take to obtain these degrees sequentially. The I.U.G. allows students accepted into the program to count up to 12 credits toward both their baccalaureate and master's degree requirements. This I.U.G. program introduces undergraduate students to graduate faculty and to the rigors of graduate study.

## I.U.G. Degree Requirements

Students in the I.U.G. program must satisfy the requirements for both their B.S. degree (either in Security and Risk Analysis or in Information Sciences and Technology) and the M.S. degree in Informatics. The first three years of the I.U.G. program is identical to the first three years of the student’s chosen B.S. program. The fourth year of the I.U.G. program differs from the fourth year of the B.S. program because of the inclusion of courses that count toward the Masters of Science degree requirements.

The graduate portion of the program requires 30 credits of coursework (3-6 credits of core courses, 6 credits of research methods, 12-18 credits of specialization, and 6 credits of research). These requirements are the same as for the M.S. degree (see previous). Double-counting of courses aids the I.U.G. student in completing these requirements within the projected 5-year period for the B.S. and M.S. degrees.

I.U.G. students have the option of completing a Thesis or a Scholarly Paper. This decision is made in conjunction with the student’s adviser and should be determined during the first year of study. (Note: Schreyer Honors College students should choose the thesis option, because the Master’s thesis can double count for the undergraduate honors thesis). Students electing to complete a thesis take IST 600 research credits, and those electing a scholarly paper take IST 594 research credits. Once an option has been chosen and either IST 600 or IST 594 taken, the student may only switch to the other option with the approval of his/her adviser and the IST Master’s Program Director. Students cannot substitute IST 600 credits for IST 594 credits except by approval of both the IST Master’s Programs Director and the Graduate School. In the event that approval is granted, additional credits of preparation may be required.

### Contrast of Thesis vs Scholarly Paper Options

Thesis	Scholarly Paper/Project Capstone
30 total credits	30 total credits
6 credits core courses: - IST 504 (required) - IST 505 (required)	3-6 credits core courses: - IST 504 (required)
12 credits specialization	12-18 credits specialization
6 credits research methods	6 credits research methods
6 credits 600 for thesis	3-6 credits 594 for scholarly paper

### A. Double Counting of Coursework

Students admitted to the I.U.G. program may double-count a maximum of 12 credits to their graduate and undergraduate degrees in the College of Information Sciences and Technology. At least 50% of the courses proposed to double-count must be at the 500 or

800 level. In their senior year, I.U.G. students will take 6 credits of specified graduate work, courses IST 504 and IST 505 (IST 505 is optional for those doing a scholarly paper), along with their other courses. These 6 credits of IST 504 and IST 505 (or another 500-level course) will apply to both the graduate program and the undergraduate IST/SRA support of option requirement. As part of the graduate specialty course requirements (12-18 credits), students will choose an additional 6 credits to double-count for both the undergraduate and graduate degrees. These courses must be at the 400-level or above. Students in the IST B.S. / IST M.S. I.U.G. program may choose any 400-level undergraduate option course (IST 411, IST 412, IST 413, IST 420, IST 421, IST 431, IST 432) that they are using to fulfill an undergraduate option requirement and apply the credits to both the undergraduate option requirement and the graduate specialty course requirement.

Students in the SRA B.S. /IST M.S. I.U.G. program may choose any 400-level undergraduate option course (SRA 433, SRA 468, SRA 471, IST 451, IST 452, IST 454, IST 456) that they are using to fulfill an undergraduate option requirement and apply the credits to both the undergraduate option requirement and the graduate specialty course requirement. Credits associated with the thesis or culminating scholarly paper, such as IST 594 and IST 600, may not be double-counted.

## **B. Enrollment Guidelines**

Student should follow the I.U.G. enrollment guidelines listed in Appendix B (forms). Failure to follow the guidelines may impact a student's financial aid.

Students should note that depending on the guidelines for a given student's situation, students may need to use a paper form and manual processing to enroll (instead of simply enrolling via LionPATH). A manual override is required to allow for cross-career (i.e., undergraduate and graduate) enrollment. This occurs when graduate (500/800) level courses are shared between the undergraduate and graduate record while the student is primarily enrolled as an undergraduate student. A form is submitted to Graduate Enrollment Services (GER) for approval that is then forwarded to the Office of the University Registrar (OUR) for processing. If a student fails to follow the I.U.G. enrollment guidelines, a student must use a 'Swap' form for correct registration. The form is submitted to GES for approval then forwarded to the Office of the University Registrar for processing.

## **C. General Requirements**

### ***Academic Performance Requirements***

A student admitted into the I.U.G. program will be monitored by his or her adviser and the IST Graduate Programs Office on an on-going basis. Students who have not maintained a 3.5 GPA in their senior year will be put on probationary status with respect to the I.U.G. program. Their ability to continue in the I.U.G. program will be based on their academic performance in the first semester of their graduate year.

## D. Committee and Thesis/Scholarly Paper

All requirements and direction provided in the M.S. Degree section (previously) for Committee Selection, M.S. Thesis Defense, General Thesis Requirements, and M.S. Scholarly Paper Requirements hold for I.U.G. students as well.

## E. Opting Out

If for any reason a student admitted to the I.U.G. program is unable to complete the requirements for the master's degree, the student will be permitted to receive the B.S. degree, assuming all the undergraduate degree requirements have been satisfactorily completed.

# IST Graduate Program Policies

## A. Independent Study Policy

The College of IST allows students to take independent study courses with IST graduate faculty members to learn about areas that are not taught in regular IST graduate courses or in graduate courses in other departments and programs. The college will use the following guidelines for the Independent Study policy:

1. Students requesting an independent study course must submit a completed Independent Study Form to the Graduate Programs Office. (Found on the [IST Graduate Student website](#))
2. The maximum number of independent study credits a student can obtain is six. The maximum hours per independent study course is three but can range from 1-3 depending on the work proposed. These credits may be used as part of the specialization area requirements.
3. Independent study is for students to do independent coursework on a subject that is not being offered in IST or elsewhere at Penn State.
4. The student must meet with the independent study instructor for the contact hours related to the number of requested credits. For example, a three-credit independent study would require three contact hours per week.
5. The output of the independent study course must be a deliverable that is relevant to the course and agreed upon by the student and the instructor.

## Graduate Student Termination Policy

### ***IST Graduate Student Termination Policy*** **(Approved by the Graduate Advisory Committee, February 2017)**

The College of IST Graduate Student Termination Policy is derived from the [Graduate Education Policies](#).

This policy will pertain to Ph.D., M.S., M.P.S., and I.U.G. students.

Students may be terminated from the graduate program in the College of IST for unsatisfactory scholarship, which includes not meeting academic standards, such as, but not limited to, minimum required grade-point average or grades in required courses for the program as well as violating ethical, moral and professional standards. A violation of these standards may result in academic sanctions including suspension or dismissal by the graduate program in which the student is enrolled, from that academic program, and/or by the Graduate School from continued or future enrollment in any graduate program at the University.

Examples of unsatisfactory scholarship may include, but are not limited to, behavior which demonstrates a failure to exhibit acceptable ethical, moral, and professional standards; violations of the academic integrity policy or other university policies; inadequate grade-point average; failure to obtain satisfactory grades in required courses for the program; failure to make satisfactory progress in research or other activities related to the culminating experience; or failing the qualifying, comprehensive, or final oral examination for doctoral students. Behaviors, which violate the Student Code of Conduct, will result in a referral to the Office of Student Conduct for further action. Once the Office of Student Conduct completes their review of the matter, the program will proceed with their review and determine appropriate academic sanctions.

The termination process may be initiated by the student's adviser, the student's M.S. or Ph.D. (thesis or dissertation) committee, the student's research or teaching supervisor, the Director of the College's graduate programs or the Graduate Advisory Committee (GAC) for the college. When one of these entities determines that the program of a graduate student must be terminated, a letter describing the need for termination will be sent to the Director of Graduate Programs. The termination recommendation will be reviewed by the Director of Graduate Programs, and with concurrence, the student will be notified by the Director of Graduate Programs that the termination process has been initiated. This termination recommendation then will be reviewed by the Graduate Advisory Committee. If approved by the GAC, the student will receive a letter from the Director of Graduate Programs indicating the reason for the termination and the date the termination will be effective, along with any other necessary information regarding the student's status.

Upon receipt of this notice, the student has the opportunity to seek a review of the decision per Appendix III of the Graduate Degree Programs Bulletin. If the student desires such a review, the student must, within ten days of receipt of the notice, submit a written appeal to the Director of Graduate Programs of the college. The Director of Graduate Programs then provides an opportunity for the student to meet with the faculty member(s) who made the decision to terminate the student's program, including the members of the Graduate Advisory Committee. This meeting must be held within 30 days of receipt of the student's written appeal.

Following this meeting, the Director of Graduate Programs must notify the student within five days, in writing, whether the termination decision has been sustained or reversed. If it is sustained, the program head shall notify the student in writing, providing the reasons for the termination, the evidence upon which the termination decision was sustained and notice of the right to appeal in writing to the Graduate School. The program head will also notify the Graduate School of the decision. Termination will be effective at the end of the semester in which the final decision is made, unless circumstances warrant immediate termination from the program.

If the termination is based upon failure to exhibit and promote the highest ethical, moral, and professional standards expected of graduate students, the Graduate School may also make a determination to dismiss the student from continued or future enrollment in any graduate program at the University.

## **Forms**

Examples of student forms can be found in Appendix A. To obtain IST graduate forms, please visit the [IST Graduate Student Website](#). The Graduate School forms are available on the [Graduate School Website](#).

# APPENDIX A

## IST and University Forms

Forms used by the M.S., and I.U.G. programs vary. For the most up-to-date versions, please visit the “Current Graduate Students” page located on the IST website at:

<https://ist.psu.edu/current/graduate>

Forms located at this site include:

- Audit Check Sheet
- Adviser Agreement Form
- Adviser Change Form
- Independent Study Form
- Internship Leave Form
- Specialization Course Waiver Form

and others.



# APPENDIX B

## Reporting and Assistance Resources

As we welcome new and returning students to campus, all members of the Penn State community are asked to be mindful of their individual responsibility to help keep the University a safe and ethical institution and an accountable steward of University funds whether generated from state, federal, student, or any other sources.

The University does not condone wrongful conduct by any member of the Penn State community no matter what position he or she may hold.

Thus, all members of the University community are urged to speak up if they see or suspect illegal, unethical, or unsafe conduct. If you do so, be assured that the University will protect you from retaliation. See [AD67](#) or contact the [Office of Ethics & Compliance](#) for more information.

The following resources are available for faculty, staff, students, and others:

### **TO MAKE A REPORT**

#### **Crime or *emergency situation***

- Contact the campus police or security office
- In an emergency, dial **911**

#### **Child abuse, including child sexual abuse**

- Contact the [Pennsylvania Child Welfare Services](#) “ChildLine” at **800-932-0313**
- If the child is in immediate danger, dial **911** first
- Penn State Authorized Adults (per AD72) are also to email [AD72@psu.edu](mailto:AD72@psu.edu) communication that a report has been made. More information on [AD72](#)

#### **Behavioral threat**

- Contact the [Behavioral Threat Management Team](#) at **855-863-BTMT (2868), 814-863-BTMT (2868)**, [reportBTMT@psu.edu](mailto:reportBTMT@psu.edu)

#### **Bias or discrimination**

- Contact the [Affirmative Action Office](#) at **814-863-0471**
- Visit the [Report Bias](#) website
- Students at University Park should call the Lion Support Help Line at 814-863-2020 to report acts of intolerance
- Students at other campuses may contact their campus Student Affairs office to report acts of intolerance

## **Sexual Harassment and other forms of sexual misconduct**

- Contact the [Affirmative Action Office](#) at **814-863-0471** or another appropriate office listed
- To file a complaint outside of the University contact:
  - The Office for Civil Rights (Philadelphia Office) at **(215) 656-8541** or email [OCR.Philadelphia@ed.gov](mailto:OCR.Philadelphia@ed.gov)
- The Equal Employment Opportunity Commission (Philadelphia District Office) at **800-669-4000**
- The Pennsylvania Human Relations Commission (Harrisburg Regional Office) at **714-787-9780**

## **Research-related**

- Contact the [Office for Research Protections](#) at **814-865-1775** or [ORProtections@psu.edu](mailto:ORProtections@psu.edu)

## **Suspected ethical or policy violations**

(Including fraud, theft, conflict of interest, retaliation, athletics compliance)

- Use Penn State Ethics and Compliance Hotline at **800-560-1637** or <https://psuethicsandcompliance.tnwreports.com> (Both are anonymous and available 24/7)

## **TO ASSIST VICTIMS**

### **Sexual violence, sexual abuse or sexual harassment**

- The Penn State Sexual Assault and Relationship Violence Hotline is available 24/7 at **800-550-7575 (TTY 866-714-7177)**
- The [University's Sexual Harassment and Assault Reporting Website](#)
- The University-wide designated sexual harassment resource person for students, regardless of sex or gender, is the Director of the [Center for Women Students](#) at 814-863-2027
- The University-wide designated sexual harassment and sexual misconduct resource person for employees is the Vice Provost for Affirmative Action at **814-864-0471**
- For University Park, the Centre County Women's Resource Center Hotline is available 24/7 at **814-234-5050** or **877-234-5050**

### **All others**

- Contact the [Center for Counseling and Psychological Services](#) (CAPS) at **814-863-0395**
- Contact the [Employee Assistance Program](#) (EAP) at **866-799-2728**

## **RESOURCES**

All employees should be aware of Penn State's Conflict of Interest policy. Please see the following for more information:

- <https://news.psu.edu/story/143476/2013/01/04/employees-reminded-disclose-conflicts-interest>
- Policy [HR91](#) – Conflict of Interest
- Policy [RA20](#) – Disclosure and Management of Significant Financial Interests
- Policy [AD86](#) – Acceptance of Gifts and Entertainment

If it is not clear where to turn for assistance, any of these offices will guide the individual to someone who can help:

- [Office of Human Resources Employee Relations Division](#) at **814-865-1412**
- [Office of University Ethics and Compliance](#) at **814-867-5088**
- [Office of Affirmative Action](#) and Title IX Coordinator at **814-863-0471**
- [Office of Student Conduct](#) at **814-863-0342**
- [Office of Internal Audit](#) at **814-865-9596**
- [Cleary Act](#) Compliance Manager at **814-863-1273**
- Your campus, college, or unit's Human Resources representative. Contact information is available at <https://hr.psu.edu/content/hr-strategic-partner-and-consultant-directory>
- [Office of Disability](#) at **814-863-1807**

## **TRAINING**

Training is available on many of the above topics. Contact the [Office of Human Resources Center for Workplace Learning and Performance](#) at **814-865-1473**

The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University prohibits discrimination and harassment against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identity, or veteran status. Discrimination or harassment against faculty, staff, or students will not be tolerated at The Pennsylvania State University. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Director, The Pennsylvania State University, 328 Boucke Building, University Park, PA 16802-5901; Tel. 814-865-4700/V, 814-863-1150/TTY. U. Ed. IST 20-06

This publication is available in alternative media on request.